Frankly Speaking

Obligations!

TRAFFIC ENGINEERING can and must provide a large part of the planning and administration needed to get war workers to and from their jobs despite increasingly serious transportation shortages. Only the application of sound traffic engineering methods can conquer the problem and avert production slowdowns in many vital war plants.

It is, of course, impossible for trained traffic engineers to do all—or even a major part—of this work. Too much needs to be done, and there are too few traffic engineers. Plant transportation managers, war transportation committees, city, state, and federal officials and others must do everything they can. Many are already doing just that. But it still remains the patriotic duty of the professional traffic engineer to utilize his scientific knowledge in this work, and in many cases to guide and direct the programs of others.

This is necessary because the traffic engineer is best fitted to find the facts and provide the remedies. Traffic engineers do not deal in rumors or publicity scares, they deal in the measure and relationship of time, volumes, capacities, individuals, and transportation units. They know that gasoline rationing, tire shortages, and lack of replacement parts are taking millions of private automobiles off the roads. They know that seventy-five per cent of all our war workers use private automobiles to get to and from their jobs, and that in many outlying plants, from ninety to ninety-five per cent of the employees are dependent on private automobiles. They know that only a limited number of buses can be built, reconditioned, or transferred from non-essential to essential runs. They know that public transit facilities cannot carry more than a fraction of the workers who will need transportation. They know that an increasing proportion of new employees, particularly women and older men, do not drive automobiles. They know that the employee transportation situation is serious, and that it will become more serious.

Traffic engineers know how to tackle these problems. They are trained to get the facts and apply the remedies. Specific remedies include applying staggered hours, establishing war worker routes, developing group riding plans, improving bus loading zones, getting maximum use from existing transit facilities, eliminating bottlenecks in vehicle movement, to mention only a few.

Although employee transportation is squarely a war plant management problem, traffic engineers are the specialists who should solve that problem for management, particularly in large key plants. Management cannot be blamed if it fails to call in traffic engineering assistance when, in many cases, it doesn't even know that there is a traffic engineering profession!

Harold V. Hammond

Vice-President I.T.E.

VOLUME XIII FEBRUARY, 1943 NUMBER 5

THE POLICING AND CONTROL OF MILITARY TRANSPORT AND EVACUATION ROUTES, MUNICIPAL AND RURAL

by Corp. L. A. Andriacchi

The Annual Meeting of the Institute of Traffic Engineers is again in session.

This year we meet with increased determination and resolve. We meet to deliberate and to discuss the very important phases of the war effort with which traffic engineers should be familiar.

Some of you may not be wearing the uniform of the Armed Forces, but your efforts are enlisted as well as those of the servicemen. You must realize that the important positions you hold in civilian life get their importance from the fact that you are representatives and servants of the people. Gentlemen, the people are at war. They feel that the war is the number one job, nothing else matters much, and it is your responsibility to do everything you can to carry out the mandate of the people. You must use every bit of your knowledge and ability to help win the war.

The men holding positions with large organizations, no doubt, are fully aware of the need for the free movement of vehicles.

Men must get to work, and raw materials must be delivered to manufacturing plants. High speed production methods, requiring expertness and specialization have made it necessary to produce the parts for many tools of war in widely separated plants. This division of labor has made streets and highways veritable arteries carrying the components necessary to build and give life to airplanes, machine guns and submarines.

The magnitude of our responsibilities does not permit a moment of laxity. It is constant vigilance which will make it possible to discover and eliminate, or make less effectual, impediments in the flow of needed labor, material and products.

Military Traffic: The majority of those present are meeting war production transportation problems in an effective manner, therefore, it is our intention to review the characteristics and control of military traffic as it becomes associated with civilian traffic.

In dealing with military traffic, it is found that many of its characteristics are distinct and are conducive to a high degree of control. However, the general aspects and requirements of war traffic may compel changes and considerable modification in the methods employed in civilian practice.

Basic Doctrine: The basic doctrine of military traffic control is "To keep traffic moving safely." In the combat zone, accidents are considered war casualties. The injured are cared for, normal traffic movement restored, and, if possible the vehicle is salvaged. Therefore the word "safely" can be dropped and the most important part of the doctrine now reads "Keep traffic moving."

Men with practical traffic experience in civilian life have long realized that the value and advantages of individual transportation should not be sacrificed at the altar of safety. Smooth, efficient traffic movement includes accident reduction which can be properly credited to planned, organized, smooth traffic flow.

Military traffic has characteristics which clearly distinguish it from civilian traffic.

1. Military drivers are trained. Various grades of drivers' permits are issued according to the general knowledge of the driver, as well as

his dexterity in handling vehicles of various sizes and weights.
2. Military traffic has discipline. Dual Command: Unit Commander, Military Police.
3. Operates on Schedule.
4. Subject to sudden interruption: enemy action.
5. Must operate over inferior and unfamiliar roads.
6. Has unity of purpose.
7. Traffic accidents in combat zone are considered war casualties.

Military traffic, in addition to having special characteristics, must adjust its operations according to the zone in which it is functioning.

The zones are divided into three general classes, namely: The zone of the interior, the theater of operations and the combat zone.

The Zone of the Interior is defined as comprising the area of the national territory NOT included in the theater of operations. We are now in the zone of the interior. If, during the delivery of this paper, reference is made to the "ZI", please remember—ZONE OF THE INTERIOR.

The objective of the ZONE OF THE INTERIOR is to exploit and develop the national resources in manpower and materiél required for military purposes and to supply the means required by the commander of the field forces at such time, in such quantities, at such places and in such a manner and form that will assure him the freedom of action necessary for the accomplishment of his mission—that of WINNING THE WAR.

The Theater of Operations is that area of land and sea that may be invaded and must be defended. Its area is declared by the War Department. There may be one, two or several THEATERS OF OPERATIONS (EAST AND WEST COASTS).

The Combat Zone is that area in which actual fighting is taking place.

The control of military traffic in the ZONE OF THE INTERIOR is essentially the same as the control of civilian traffic. As a matter of fact, the great majority of the total traffic volume is made up of civilian traffic, seventy-five per cent (75%) of which is necessary to national welfare. Thus we are confronted with a problem in which military traffic must go through and civilian traffic must not be held up, as it is vital to our war production. Movement with a maximum of freedom and a minimum of conflict is the goal which should be sought.

The high ratio of civilian to military traffic in the "ZI" is somewhat of a handicap, because civilian traffic is not as controllable as military traffic. And in addition, military drivers are constantly reminded of the necessity for the coordination of civilian and military traffic.

There are three phases of military traffic control in the "ZI".
1. Traffic at posts, camps and stations.
2. Motor marches.
3. Traffic control in extreme emergencies.

The control of traffic at posts, camps and stations does not involve or concern the average civilian. However, civilian traffic operating on the streets of these areas must conform with military traffic regulations in effect at that location.

The control of traffic on motor marches and during emergencies will undoubtedly come very close to affecting civilian traffic.

Motor marches ordinarily fall into three classes—close column, open column and infiltration.

Close column march is a type of movement wherein the column is formed as compactly as practicable in order to reduce the time length to a minimum and to utilize the full traffic capacity of the roadway.

Under this method of operation the time interval between march units

tail to head, may vary from one and one half minutes to three minutes. The spacing between vehicles is as close as drivers believe safe, and usually is set at a ten yard minimum.

In civilian practice we were quite familiar with the great volumes of vehicles which could be moved under similar vehicle spacings of headways. Major Arnold Vey, formerly Traffic Engineer of New Jersey, and others can quote some high figures for cars per hour per lane under these conditions.

Ordinarily the close column march method in the "ZI" is employed in cities and congested areas, and for short large-scale movements.

Its advantages are as follow:

1. Bottlenecks, such as narrow roadways and bridges, congested areas, etc., can be cleared quickly, thereby causing minimum delay at these critical points.
2. Due to its compactness, close column march permits ease of control. Commands may be passed on readily and conformity is quite easily supervised.
3. When travelling over unfamiliar roads, this type of march reduces to a minimum the necessity for "intersection hunting." This is a distinct advantage when operating under conditions of minimum illumination.

Of course, as most things we do are compromises with advantages and disadvantages, it also behooves us to be aware of the drawbacks in this case.

Aside from the tactical disadvantages, close column march has the following weaknesses:

1. Inter column and intra column interference. Effect of the action of one vehicle in a column upon the others in that column—as well as the effect of one column on another.
2. The necessity for constant vigilance, due to the short distance between vehicles, causes considerable driver fatigue.
3. Terminal congestion. Vehicles arriving a few seconds apart cause accumulations which are a definite factor in military movements.
4. Close column marches do not permit infiltration, and may induce hazardous passing maneuvers.

Infiltration is a type of march wherein vehicles are dispatched individually or in small groups, each vehicle then proceeding to its destination independently of all other vehicles. This operation is similar to that carried on by trucking companies as they load and dispatch vehicles to their various destinations.

Vehicles are dispatched one to five at a time with an average density of about five per mile.

In this type of movement it is necessary that routes be carefully marked and that each driver be supplied with a strip map as well as specific detailed instructions.

Passing is permitted, but intermingling or concentration of vehicles must be avoided.

Ordinarily control personnel is placed along the route.

The advantages are:

1. Minimum interference with other military vehicles as well as with civilian traffic, as vehicles become a part of the regular traffic.
2. A high rate of march can be obtained, vehicles can get to their destinations quickly.
3. Speed variations of other vehicles have a minimum of effect.
4. Very little driver fatigue as the strain of operation is reduced almost to the civilian level.
5. Little or no interference with cross traffic as vehicles operate practically as single units.
6. No need for traffic escort.
7. Its similarity to civilian practice is a definite factor in its favor.

8. Requires a minimum of planning or coordination.
9. As a result of its spacing, it has a high factor of safety.

Its disadvantages are:

1. Greater length of column.
2. Supervision and control is reduced to a minimum.
3. Requires careful route marking for day and night.
4. Each driver must be given individual instructions.
5. In attempting to obtain control and march discipline, additional post and patrols may be needed.

It may be stated that this type of movement is especially adapted to the "Go when ready" principle of operation.

Open Column: In this type of formation, the objective is to maintain approximately constant headways between vehicles at all speeds, with two to five minutes between march units.

Intervehicular lead varies directly as the speed of movement, because it is the product of the speed in miles per hour and the speedometer multiple.

Control is one of the desirable characteristics of this type of march.

Due to the rather small headways between successive vehicles, open column marching presents somewhat of a barrier to cross traffic.

Where cross traffic is heavy an escort is necessary for the open column type of marching.

Advantages of the Open Column: The rate of march is practically equal to that of infiltration marching.

Emergency rerouting is simplified through open column uniformity and it is possible to reroute the entire march with a minimum of effort.

There is less fatigue of the driver and probability of accidents is reduced due to the time interval between vehicles.

On dusty roads the vision of the drivers is not impared resulting in better vehicle control.

Low intracolumn interference.

Disadvantages: The chief disadvantage is the training of drivers. They must be trained to judge accurately their prescribed distances and maintain this distance for a considerable length of time.

Also the maximum capacity of the roadway is not utilized.

Types of Control

Organizational control and area control are, in general, the two types employed.

Organizational Control: In this type of control, traffic personnel from the organization on the march usually provides escort control.

The escort controls traffic along the route travelled by the column but applies only sufficient control to provide free movement with a minimum of interruption to other traffic.

This type of control is generally used where it is only anticipated that civilian or less important military traffic will be in conflict.

Area Control: Is accomplished by the headquarters in charge of traffic control for the area.

Point, escort and patrol personnel are provded in order to regulate all traffic in a manner consistent with the plan in effect.

Point Control: Point control concerns itself with the regulation of traffic at intersections or at bottlenecks.

In the assignment of right-of-way control, personnel must bear in mind that when priorities are in effect vehicles with the highest priority have preference and a clear path should be provided for vehicles on schedule so that they may be able to maintain movement as planned.

When traffic movements at intersections do not involve columns, priorities, schedules, etc., the regulation of traffic will follow closely the methods used in civilian practice, giving due consideration to all the factors

governing direction and duration of movements.

It must be emphasized that only sufficient regulation should be used to bring about efficient traffic movement. Over-regulation is undesirable and frequently actually impedes the free flow of traffic.

Escorts: Escorts are used when it is desired to cause other traffic to yield the right-of-way to a certain column. They may be employed where area control is also in effect, but are most generally used when possible conflict with traffic of lesser importance may be expected.

Personnel may be assigned to precede and follow a column, or there may be sufficient numbers to regulate traffic at the various intersections through which the column passes.

Patrols. Motorized patrols furnish a valuable service in the control of traffic, and they should be used wherever practicable. Patrols employed along important routes should be operated so that they cover the road section between control points. It is their duty to closely check critical points where traffic congestion or tie-ups may occur.

CONTROL CLASSIFICATION OF ROUTES

The classification of routes according to the degree of control applied is based on the minimum control required to obtain results.

Open Routes: An open route is one over which a minimum of supervision is normally applied. Ordinarily control is necessary only at intersections with more important routes. Similar to country roads carrying small traffic volumes.

Supervised Routes: A supervised route is one over which limited control is exercised. (Traffic posts, traffic patrols or both). Time of access may be controlled so as to be in conformity with the traffic situation. The control used on this route is comparable to the civilian control used on primary highways.

Dispatch Routes: A dispatch route is a roadway over which full control both as to priorities of use and the regulated movement of traffic in time and space is exercised by a central traffic authority. The routes are controlled by schedules, and their operation is analogous to that of a railroad.

Reserved Routes: A reserved route is one that is set aside for the exclusive use of a designated unit or specified type of traffic, or for other specific purposes.

EVACUATION

Refugee movements probably cause the most crucial situation in the control of civilian traffic. Such movements should be prohibited when they are not warranted, or steps taken in planning transportation and traffic control which eliminates conflict with military traffic.

Military police and civilian authorities should collaborate in prohibiting the unauthorized uses of roads. In some cases it may be necessary to establish roads blockaded at key points.

Due to the undisciplined and panicky nature of this type of movement it is often necessary to resort to unusual methods of control. Point of constriction should be located immediately and sufficient personnel provided to handle a situation of this character.

The refugees should be given information and directions in the best possible manner so as to keep confusion to a minimum. Bulldozers should be made available to clear routes for military traffic, if necessary.

There is great need for firmness in the handling of refugee traffic. However, the antagonizing of civilians should be avoided as much as possible. The attitude of the control personnel should tend to minimize fear and panic. Treat all persons equally. Give directions in a positive manner. Keep calm and avoid harshness in handling people.

The following points should be conveyed to the refugees:

1. Orders must be obeyed.
2. Obedience to orders is the best avenue of safety.
3. There is no occasion for panic.

It must be remembered that these situations may require considerable crowd control, and personnel should be provided for that purpose.

Emphasis should be placed on the fact that evacuation operations must be planned and organized. And the public should be informed about the plan and its operations and objectives. Normally used routes should be followed except where they are needed by the military forces.

It must be realized that the military personnel has as its purpose the defense and protection of the people, therefore, to avoid the possibility of interrupting or impeding military operations, forced evacuations should be authorized only by the military commander.

In the last world war it was found that the military police rendered a great service. It was also realized that they were called upon to do many things which were of sufficient importance to require special training. The modern Military Policemen is a well-trained soldier, whose functions and duties have warranted the creation of the Corps of Military Police.

The Traffic Control Military Policeman who completes the present training course is constantly reminded that he must:

1. Be and act alert.
2. Display confidence and composure.
3. Act without evidence of indecision.
4. Execute signals and maneuvers in a precise military manner.
5. Display pride and interest in assigned duties and responsibilities.
6. Maintain self control.
7. Provide assistance and information in a willing manner.
8. Treat all persons fairly and impartially.
9. Be firm without being officious or overbearing.
10. Be courteous.
11. Be reasonable and use common sense.
12. Be neat in personal appearance.
13. Study and know his duties, be efficient and workmanlike.
14. Keep informed on First Aid.
15. Be diplomatic and tactful.

Civilian and Military Collaboration

Military traffic personnel are instructed to seek the close cooperation of civil authorities, and to become informed on civilian traffic regulations and characteristics. This, of course, is as it should be, for traffic engineers can provide invaluable information concerning traffic volumes and bridges and roadway widths and types as well as other factors which may affect the movement of men, materials and equipment.

Gentlemen, the part you play in this historic event is one which deserves a great deal of credit and praise as you must chart your own course and then take on and carry out the job of getting it done.

Men in the military service have dedicated their efforts to their country and thus their work, authority and objectives are quite clearly defined. You are giving freely and voluntarily of your knowledge and experience, and to you must go, when the last page is written, the honor of living up to the true heritage of the world's greatest benefactor, the Engineer.

Address delivered by Corp. L. A. Andriacchi (Assoc. I.T.E.) at the Annual Meeting of the Institute of Traffic Engineers, Chicago, Illinois, October 1942.

THE SELECTION AND MARKING OF MILITARY, TRANSPORT, AND EVACUATION ROUTES

by LT. ROBERT O. SWAIN

WHEN the Jap struck at Pearl Harbor on December 7, 1941, he brought to a close an American era of haphazard use of roads and motor transport. Although many gains had been made in planned traffic circulation, the impact of this war for survival brought forcibly to our attention that our planning had been inadequate and that organization of our road facilities was below standards necessary for the furtherance of the war effort. We suddenly realized that efficient prosecution of modern warfare requires that essential transportation operations be certain and continuous, that a nation at war must obtain best use of all its facilities or perish, and that we must accept the challenge of the Axis gangsters and surpass them in what they have so often boasted was their strongest weapon and of which the Democracies were incapable —the ability to organize and direct material assets.

Here in the nation which has the most marvelous road system and the greatest amount of motor transport in the world, we suddenly awoke to the fact that these things unorganized are not enough. We found that a shortage of motor transport and roads would exist for war needs if methods of thoughtless peacetime use were continued. We found that the unusual demands placed on the road system by the war requires a planned traffic circulation program to expedite military movements and prevent interference between military and civilian traffic and to keep the ever-increasing volume of war supplies moving at an ever-increasing pace. Then, we looked at the tragic experience of France with civilian evacuation—a problem which unsolved contributed in no small measure to her defeat.

These, then, are our problems, and to a great many of you gentlemen here today will fall the responsibility for the solutions. How well you plan, how well you organize, how well you direct; all will be reflected in the swiftness of America's progress to final victory.

In order that military needs are met, this planning must be done in consultation with military authorities; although, until such time as an area is declared a theater of operations, civilian authorities are primarily responsible for plans for routing and control of traffic. Since roads extend beyond political boundaries, traffic circulation plans of adjacent areas must be coordinated and must be uniform in their application. Basic decisions which affect military operations must be made by military authorities, since they are charged with the successful prosecution of the war and, therefore, must control all means of accomplishing that mission. Military authorities also have measures at their disposal for evaluating any enemy threat. Particularly in the case of civilian evacuation in the face of an invading army basic decisions are the province of the military. Basic military decisions involved in that case include time evacuation is to begin; area to be evacuated; and designation of routes, schedules, and measures for control of movements.

The selection of military, transport and evacuation routes involves the assimilation of all pertinent information concerning the physical characteristics of the roadnet, location of terminals, present traffic data, probable traffic demands, present traffic control facilities, and future control requirements. The use of all roads is then prescribed. The general characteristics sought in

such a traffic circulation plan are simplicity and flexibility. Unnecessary restrictions and regulations on the use of roads must be avoided. Desired flexibility is obtained through the use of all roads practicable and the planning of alternate routes in the event of sudden disruption of planned circulation.

Information concerning the physical properties of roads, which is needed for planning, includes bridge capacities and data concerning other critical locations of the roadnet; location and characteristics of bottleneck points; type of surface, condition, and road width or number of lanes of the various roads; location, type, and characteristics of limiting roadway features and appurtenances, such as underpasses and steep grades; mileage and time-distance between important intersections; sections of roads needing road or bridge repair; and possible detours and alternate routes available.

Secondly, the origins and destinations of each type of traffic must be studied in relationship to the roadnet, before routes which will best serve the needs of each can be organized. These terminals include all types of military installations, civilian supply distribution points, defense areas, factories, industrial establishments, cities and towns, staging areas, and ports of embarkation.

Thirdly, probable traffic flows must be estimated on the probable number of personnel and amount of supplies and material to be moved from the various points of origin to the various points of destination. These traffic flow estimates must be correlated with the traffic capacity of the various roads available. Existing local, civilian traffic flows must be taken into account.

After collection and analysis of all pertinent data, the real work of selecting various routes is begun. Immediately we are confronted with two situations; the present one existing in the United States today, or what is known as the zone of the interior, where enemy action does not hamper the use of roads, and military operations do not require the use of all roads; and the one, which everyone hopes we will not have to face, which would result from an invasion requiring intensive military operations in certain areas and possible large scale civilian evacuation. I am not going to touch on the subject of evacuation of certain classes of the population, such as children, the aged and infirm, institutionalized individuals and the like, which would take place if possibility of air attack existed. That sort of evacuation is more of a dispersal from districts of high population concentrations to surrounding open areas, and traffic problems encountered are much less severe than those created by the real thing—full scale evacuation.

In planning military and transport routes in the zone of the interior, the procedure is to establish routes which will cause as little interference among military, transport, and essential civilian traffic as is practicable. Wherever possible, the classes of traffic are separated in space. Congested areas are by-passed. Traffic bottlenecks are avoided. Necessary, short connecting roads are built. In order to reduce the time required to pass through congested areas and to minimize interference with civilian traffic, multiple routes may be marked, thereby allowing large scale military movements to pass on a broad front. It is not necessary to say that circuitious routes are avoided, if possible; those giving the quickest and easiest access from points of production to points of use usually meet the requirements most advantageously.

Military routes involve the organization of the roadnet to meet the needs of troop movements from training camps to ports of embarkation,

training marches, the movement of war material, secrecy considerations, and all the vast program of motor transport involved in getting America's war potential where it is needed.

Transport routes are organized very similarly to such military routes to insure the expeditious movement of the huge quantities of supplies and materials needed to sustain large metropolitan centers without the wastefulness of essential motor transport all too often symptomatic of peacetime planning.

The remaining routes are organized into a secondary circulation system, paralleling, insofar as practicable, the military and transport routes; and civilian road users are instructed and encouraged to make all practical use of this system in order to avoid conflict with military and transport traffic.

Since the success of combat operations very often depends on the uninterrupted use of roads, the prevention of interference with military road movements in the combat zone is essential. This brings up the subject of evacuation. Efficiency in evacuation is dependent largely on the thoroughness of advance preparations. The available roadnet must be completely organized far in advance of possible evacuation to handle military movements and civilian evacuation, when required. The requirements of military traffic must be given prior consideration and evacuation movements barred from military routes. Since defeat of the enemy is the primary consideration, final decision as to military and evacuation routes is the function of the military commander. However, it is up to civilian traffic officials to assist in necessary planning and collection of data upon which the military commander must base his decisions. Basically, evacuation traffic is assigned to roads which may be used without interference with military movements. The locations of assembly centers or evacuees collecting stations in relationship to location of dispersal centers must be studied in order to assign routes providing minimum of conflict points between movements from various assembly centers. Routes chosen should avoid traffic bottlenecks wherever feasible. Alternate routes should be designated, wherever practicable, to provide for the swift bypassing of possible road blocks in order to insure the continued movement of evacuees.

Normally, evacuation will be accomplished in two phases. The initial phase of evacuation will occur some time prior to expected land engagements of military forces in the area. During this period, individuals evacuate voluntarily and certain classes such as the helpless or near-helpless are removed from the area. As most of the vehicles involved in this phase of evacuation will have separate destinations and times of movement, traffic resulting will be largely of the nature of individual movements and rapid dispersion over available roads is to be expected. During this same period, military operations will not require as many, nor as intensive use of, roads as later.

The second phase of evacuation is that phase during which remaining civilians are cleared from the area. This may be a regimented stage, characterized by systemization and regimentation of evacuation movements. Military demands on the roadnet may be expected to be much heavier, consequently restricting evacuation movements to roads which are comparatively few in number. Hence, the planned use of available roads becomes progressively more important as the evacuation accelerates and the clash of armed forces draws nearer.

An important aspect of planned traffic circulation is the problem of signing routes in order to familiarize

road users with them and to call attention to the benefits of their use. Transport and military routes in the zone of the interior may be marked by permanent signs. A number of cities have already planned and marked routes for the use of military traffic, and a number of states and regional areas have marked such military routes as well as routes for essential war, transport, and other civilian traffic. Recognizing the need for the development of distinctive signs for the marking of each type of route, and each individual route, the War Department has cooperated with the Joint Committee on Uniform Traffic Control Devices in the development and standardization of necessary signs, which will be described in the forthcoming revision of the Manual on Uniform Traffic Control Devices.

Over a year ago, the Engineer Board, during its study of military traffic problems, developed signs and methods of installation applicable to military needs in the combat zone. These signs are printed on cardboard and designed to facilitate destruction, if that becomes necessary in the face of an enemy advance. Reproduction methods have a capacity of approximately 1200 per hour. These signs are easily mounted in the field by means of a commercial stapling hammer.

Sign techniques which have been developed for control of tactical traffic are easily adapted for the posting of signs necessary to guide evacuation movements. Quick and easy methods of reproduction and posting are especially necessary where planned circulation is subject to unforeseen interruptions (such as would be the case in evacuation) and where movements must be detoured quickly and new routes marked. Another important item is the organization of special sign crews trained to carry out this work. The accomplishment of these objectives will be necessarily a function of existing Civil Authorities augmenting Military Police.

In closing, I wish to touch on the subject of public cooperation, a factor so essential to any planned traffic circulation. This cooperation is enlisted by fully educating the public as to the advantages of the routing system, by inculcating a clear understanding of what is expected of each individual, and by promoting a feeling that adherence to the plan is essential to the war effort.

Address delivered by Robert O. Swain (Assoc. I.T.E.), 1st Lt., Corps of Engineers, Engineer Board, Fort Belvoir, Virginia, at the Annual Meeting of the Institute of Traffic Engineers, Chicago, Illinois, October 1942.

REHABILITATING SIGNS

by RAY F. RIEGELMEIER

AN inventory of existing traffic signs was made in 65 counties of the State of Pennsylvania to ascertain the possibility of eliminating each of the local sign inventories and establishing a central traffic sign inventory at Harrisburg. The results of the inventory proved conclusively that it would be extremely desirable to establish the central sign inventory and allow only a minimum stock of signs in each of the County Maintenance Offices.

Excess stocks of signs from each county were brought to Harrisburg and signs which were on the records but which were no longer useable were scrapped with the result that some

hundreds of tons of steel were furnished to aid the war effort.

In addition to these scrapped signs, many other signs of an old style were found in the stocks. In the majority of instances, the signs had never been used but were of improper design and were not useable in their existing condition. These signs were returned to Harrisburg along with the excess stock of standard signs.

When the project was completed, we found many tons of old non-standard signs in which the copper-bearing galvannealed steel was in excellent condition. After various experiments, we decided upon a program to rehabilitate these signs. The rehabilitation program consisted of the following:

1. Remove all paint coatings from the old signs. For this purpose a hot caustic soda solution was used which was followed by a hot water rinse to remove all traces of the soda and the sign was then allowed to air-dry thoroughly.

2. Buff signs with a standard 12″ diameter wire buffing wheel to remove any remnants of paint flakes, pigment, etc., which might adhere.

3. On the assumption that the old pattern and the new pattern to be placed on the sign are somewhat complicated, the old sign was flattened between two (2) hardened steel plain dies. The embossing pressure required to flatten these signs is approximately five hundred (500) tons. Even with this high pressure, the pressed-in lines from the corner edges of the old symbols are still slightly visible. Such lines are like cold chisel cuts and they could not be forged out of the metal under any pressure, even from thin gauge signs. A flexible disc grinder is used to reduce these impressions as much as possible. In general, the old signs should be reduced to a reasonably flat surface without any waves in the metal.

After flattening, the signs are cut to the desired size and shape of the new signs and are then re-embossed and painted just as any new metal sign is embossed and painted. Our revision normally consists in painting two (2) flat coats on the sign and one (1) stenciled message coat on the embossing. The signs are oven-baked after each paint application.

If, however, a white background type sign is required, it is first painted with a coat of yellow traffic sign paint to take advantage of the protective feature offered by chrome yellow paint. The two white paint applications are then made and these are followed by the embossing application.

Buffing and surface grinding will remove the protective zinc coating from the steel to a certain extent if care is not exercised in these processes.

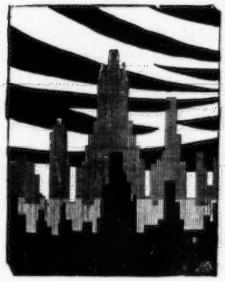
Buffing off rust spots which may exist will also remove the zinc coating. It is primarily because of this loss of zinc coating that the yellow primer coat is recommended on the signs.

To achieve the most satisfactory results, old signs which have not become rusty are the most likely prospects for the rehabilitation program and will make the most desirable rebuilt signs.

In order to comply with the recent proclamation of the Governor of Pennsylvania, all existing SPEED LIMIT 50 MILES signs are being covered with a sign face made of Structo Board. These boards are given two (2) coats of paint and the message VICTORY SPEED 35 MILES is stenciled thereon.

The signs have already been erected in many parts of the State at a cost of less than $.50 per sign.

Address delivered by Roy F. Riegelmeier (Mem. I.T.E.), Traffic Engineer, Department of Highways, Commonwealth of Pennsylvania, Harrisburg, Pa., at the Annual Meeting of the Institute of Traffic Engineers, Chicago, Illinois, October 1942.



Stop, Look and Listen

PRESENTING!

Mr. Lloyd M. Braff (Assoc. I.T.E.), as new Circulation Manager for TRAFFIC ENGINEERING.

Mr. Braff was formerly Assistant Traffic Engineer in charge of traffic planning and research with the Chicago Surface Lines before assuming his present position as Assistant Traffic Engineer with the Traffic Engineering Department of Detroit, Michigan.

The Editors and staff of TRAFFIC ENGINEERING welcome Mr. Braff not only as a competent traffic engineer, but also as an experienced circulation man for he has served on the editorial staff of the PROCEEDINGS of the Institute for 1936, 1937, and 1938 and edited the 1938 issue.

The Editors also take this opportunity of expressing their appreciation to Mr. Bernard C. Hartung, our former Circulation Manager, who during his term of service set exceedingly high standards in circulation management.

PERSONALS

Mr. A. Wallace Gove (Associate I.T.E.) and Traffic Engineer, Worcester, Massachusetts, was recently elected President of the Worcester Society of Civil Engineers. Mr. Gove writes that in January of this year control over signs, signals and markings was transferred from the Worcester Police Department of Public Works, and that the Worcester Safety Council has voted to actively participate in the promotion of staggered hours.

Mr. I. S. Shattuck (Mem. I.T.E.) writes, as Transportation Advisor for the National Housing Agency in Washington, D. C., that his present position entails the securing of improved war worker transportation via public carriers and private cars. The objective of this work is to obtain the most efficient use of all possible transportation that will minimize the need for new war housing when materials required for the latter are much greater than required for the transportation involved.

Mr. Theodore T. McCrosky (Mem. I.T.E.) and former Executive Director of the Chicago Plan Commission, has recently received the commission of Lieutenant Commander in the United States Naval Reserve.

The new address of Lieutenant Commander Theodore T. McCrosky, U.S.N.R., is Navy Building, Washington, D. C. Please mark all letters

"Personal." The members of I.T.E. wish Lieutenant Commander McCrosky success in his new duties.

Mr. Virden A. Rittgers (Mem. I.T.E. and Associate of TRAFFIC ENGINEERING) has been released from his position as City Traffic Engineer, Richmond, Va., at the request of Brig. Gen. U. S. Grant, III, chief of the Office of Civilian Defense, Protection Branch, to join the O.C.D. Headquarters Staff in Washington, D. C., to serve as Transport Engineer with the Transportation and Evacuation Section in charge of the Transportation Service Unit.

Mr. Henry K. Evans (Jun. I.T.E. and Associate Editor of TRAFFIC ENGINEERING), formerly Traffic Engineer with the National Safety Council and member of the Engineering Staff of the Automobile Club of Southern California, recently assumed the position of Traffic and Transport Engineer with the Traffic and Transportation Division of the National Conservation Bureau, 60 John Street, New York City, of which division Mr. Harold F. Hammond, Vice-President of the Institute of Traffic Engineers is Director.

RIDE SHARING IN WISCONSIN

Recent car occupancy counts made in Wisconsin by the State Highway Traffic Advisory Committee show the following average number of persons per vehicle:

Urban general traffic (52 stations)	1.48
Urban industrial traffic (31 stations)	1.71
Rural general traffic (8 stations)	2.35
Rural industrial traffic (2 stations)	3.63

Urban general traffic shows no measurable progress in group riding according to the Committee's report. The small amount of group riding indicated by the urban industrial traffic counts is explained as due to four factors (a) residence near enough to work to permit driving on "A" card only, (b) reluctance on the part of management to promote group riding, (c) reluctance of employees to change their driving habits, and (d) inertia preventing necessary periodic readjustments among ride sharing groups occasioned by changes in shifts or place of residence.

The good showing made by rural industrial traffic is in considerable contrast to the occupancy in urban areas. Vehicles in this category were entering or leaving two large war plants located some distance from a city. The employees of these plants were dependent to a large extent on their private cars, and the management had been active in promoting group riding. One count of 122 cars near one of these plants revealed an average occupancy of 4.07 persons per automobile.

Contributed by Wayne N. Volk, Traffic Engineer, State of Wisconsin.

NEW DIRECTORS

The Board of Direction of the Institute of Traffic Engineers has appointed by unanimous vote Mr. Robert A. Mitchell (Mem. I.T.E.), and Transportation Director of the Philadelphia-Metropolitan War Transportation Committee to serve out the term of office of Major Arnold Vey (Mem. I.T.E.), and former Traffic Engineer of the State of New Jersey. Also by unanimous vote, Mr. William R. McConochie (Mem. I.T.E.), and Traffic Engineer for the Chicago Surface Lines, was appointed to serve out the term of office of Captain Harry H. Harrison, former Traffic Engineer of the State of Illinois and who is now serving over-seas.

QUAD-CITY TRANSPORTATION PROGRAM

In order to relieve peak bus transportation loads 3,000 office workers in Davenport (Iowa), Rock Island, Moline, and East Moline (Illinois), changed their working hours, starting and quitting 15 minutes later in the day, effective January 18. At the same time, the Davenport and the Rock Island High Schools were directed to close at 3:05 P.M. instead of 3:30 P.M., which will release six school tripper buses in time to relieve the peak load on buses carrying the outgoing workers at the Rock Island Arsenal at 3:37 P.M.

These changes were ordered by the Quad-City War Transportation Committee, based on recommendations of Henry K. Evans (Jun. I.T.E.), National Safety Council Traffic Engineer, who has been assisting the Committee since its formation in August of last year.

Previously stores in the four cities had been asked to change hours from the former 9:00-5:30 to 9:30-6:00, which was effected on November 1, 1942. The War Transportation Committee also ordered the elimination of 133 bus stops, and shortening of two lines to facilitate bus transportation, and the Bus Lines Manager, R. J. Smith stated that without these changes an actual breakdown in transportation would have occurred during the month of December. The 1942 passenger total was 50 per cent higher than during the previous year, while January loads are even greater. Although 13 new buses were recently acquired by the Tri-City bus lines, the manpower and parts shortage, coupled with the fact that their use is restricted to 2,000 miles per month, has practically offset the advantage gained.

It is expected that further staggering of industrial and school hours will be required to meet the problems of increasing demand for bus transportation. At a recent meeting of the plant transportation committee, Evans disclosed that the recent staggered hours survey showed that 70 per cent of all industrial employees in the area change shifts between 7 and 8 A.M., while 60 per cent change in the one hour 3 to 4 P.M., leading to peak demands for bus transportation at these times. Furthermore, employment is steadily increasing in the area.

A uniform swap-the-ride plan has been adopted by the plants and business houses in the area, whereby all employees are registered according to zone of residence, which facilitates formation of groups for ride sharing or swapping between industries. Uniform zoned maps and registration cards are being furnished by the Quad-City War Transportation Committee. The details of the plan were explained to the transportation committee chairman of approximately 50 plants at a recent meeting, at which time, also representatives of the local ration boards explained that in granting future "B" and "C" books, they will be much less lenient than in the past. The plant transportation committees were made to realize that it is their responsibility to see that every car coming to their plant is filled, else supplemental gas rations will not be issued the drivers, and that an effective group riding plan is the only means of assuring these aims.

Since last summer a continuous transportation conservation publicity program has been carried on by the War Transportation Committee, including radio plays, interviews and continuous announcements, newspaper stories and cartoons, slogan contests, furnishing posters to plants and stores, advertising "swap-the-ride" on many outdoor billboards, and frequent speakers at schools and service clubs.

EMPLOYEE TRANSPORTATION CONFERENCE

Under the auspices of the Office of Defense Transportation and co-sponsored by the National Association of Manufacturers and the National Conservation Bureau in cooperation with the I.T.E., A.T.A., A.S.F., N.S.C., H.T.A.C.W.D. and other interested agencies a Wartime Employee Transportation Conference will be held on Thursday, February 25, 1943 at the Hotel Pennsylvania, New York City.

O.D.T. Director Joseph B. Eastman is expected at the luncheon to make significant comments at this "*all industry*" conference on the present and future status of the rubber, gasoline and spare parts problems as they affect industrial employee transportation.

Colonel F. C. Horner of the Transportation Corps will voice the Army's increasing concern about employee transportation at war contract plants and is expected to explain how the Army "contract allowance" of $3.00 per year per employee for transportation study and activity will help alleviate a possible crisis in the near future.

Three panel discussions will be held covering such problems as handling tire and gasoline rationing problems, conducting share-ride programs, use of questionnaires, filing facts, setting up procedures, applying staggered hours, parking of employees' cars, eliminating traffic bottlenecks and transportation vs. housing.

Policies and plans devised and their successful operation in leading industrial plants will be discussed by authorities in closest touch with the situation.

Hotel Pennsylvania, N. Y.
Thursday, February 25, 1943

DO YOU KNOW

Detroit has a new pedestrian protection law.

Lack of conspicuousness was reported as a major factor causing fatalities and injuries to military police at intersections at night.

A Group Riding Headquarters has been established in Providence, R. I., where motorists may form or join ride-to-work clubs. Little use is being made of the Headquarters by motorists despite widespread publicity.

Providence is considering the formation of a Junior Police Division of 1,000 youngsters to assist the police for the duration. Safety will be stressed.

Checks are being made of motorists in Indiana who are driving at speeds injurious to tires and safety. A special warning is issued and the evidence gathered is taken into account when offenders apply for tires.

A survey completed by the National Automobile Dealers Association reveals that more than 92 per cent of the used tires in automobile dealers' stocks are in a condition where they can be recapped. 13.8 per cent are in a condition where they will yield 10,000 or more miles.

Effective means of marking highways and lighting vehicles for possible blackouts are being studied by the Ohio Department of Highways. They include various types of center line markings, intersection and railroad crossing markings and guard rail reflectors.

U. S. trucks and buses, it is claimed, wear out tires at the rate of 35,000 daily.

Parking meters were voted down by Providence voters for the second time in a referendum last fall.

In Montclair, New Jersey, nickels from parking meters are to pay for free municipal parking lots near the central business section, according to town officials.

We've moved

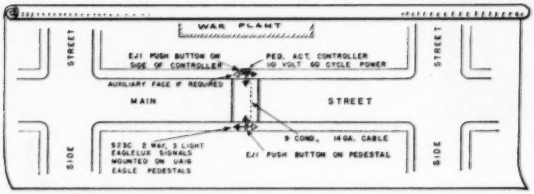
Due to expansion of our business we have moved to larger quarters with improved manufacturing and research facilities.

Signal Service Corporation

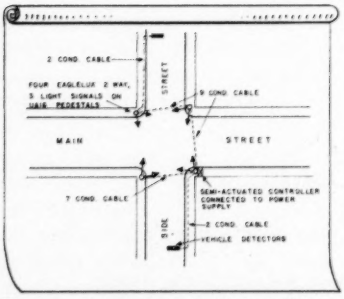
1239 SPRINGFIELD AVENUE, IRVINGTON, N. J.

Telephone Essex 3-7800

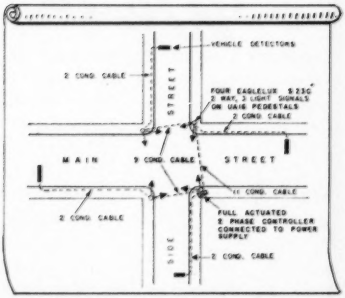
NOW AVAILABLE *for* WAR PLANT PROTECTION



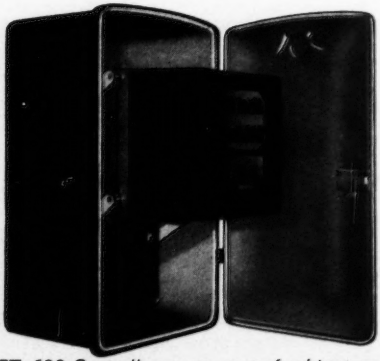
This pedestrian actuated signal installation provides good protection for the war worker on foot.



This semi-actuated signal installation assures protection for the workers in vehicles or on foot.



This actuated installation is ideal for that parking lot problem.



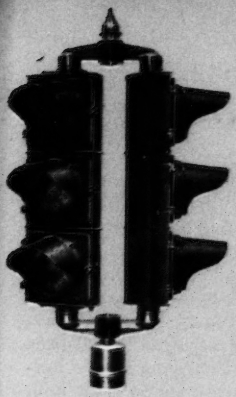
ET-600 Controller swung out of cabinet on folding frame.

Semi-actuated equipment is available for manual push button control or vehicle actuated control. Ask for Bulletin No. 252.

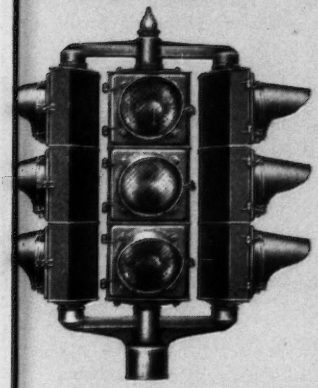
Invest in Liberty by Buying War Bonds

EAGLE SIGNAL CORPORATION

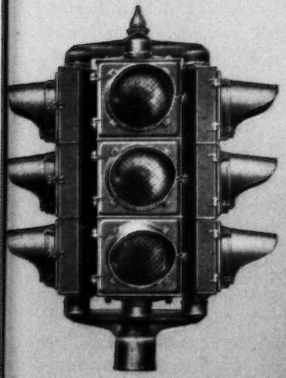
MOLINE ILLINOIS



Type TRP-223 M
-way aluminum mounting brackets
with separate slip fitter



Type TRP-333 M
-way aluminum mounting brackets
with integral slip fitter



Type TRP-443 M
-way aluminum mounting brackets
with integral slip fitter

TRAFFIC SIGNALS YOU'LL BE PROUD TO INSTALL

PROUD! Because you have accomplished something really fine — an installation of signals that you can point to with pride and feel good and glad because it's your work. Sturdy and attractive Marbelite Signals! Better Built quality that you will find difficult to match anywhere. And how you will appreciate those aluminum mounting brackets which replace the troublesome pipe fittings assembly—brackets which make the signal so much more compact!

It's no wonder that so many of the large Municipal and State Highway Traffic Departments are installing hundreds of Marbelite Signals. These Better Built Signals are bound to win the preference. Write today for a descriptive folder, and request quotations on the type signals you would like to install.

THE MARBELITE CO., INC.
26 WARREN ST., NEW YORK, N. Y.

MARBELITE

BETTER BUILT SIGNALS

FEDERAL TRANSPORTATION AID!

A National Resources Planning Board report recommends government-sponsored post-war modernization of the nation's transportation facilities.

All agencies dealing with transportation are visualized consolidated into one agency with responsibility for coordinating all transportation systems —Air, Railroad, Highway and Waterway — constructing terminals with emphasis on off-street parking facilities in urban areas; and encouraging new forms of transport. Owen D. Young, Chairman of the Committee, apparently considers that no better time or public enterprise could be chosen to plan and later to occupy the millions of men released from war activities than modernization of transport facilities.

The report states that after the war "a transport-rationed people will demand and secure a vastly enlarged system of highways, airways, and to a lesser degree, waterways that will overshadow all progress in the past."

Railroad men are equally optimistic about railroad passenger and freight movement.

GRAPHIC PRESENTATION OF STAGGERED HOURS IN PORTLAND, OREGON

In Portland, Oregon the planning of staggered hours is like child's play —with blocks. Apparently it's the old story of a complicated problem, ingenious minds, and a simple solution.

A few minutes' study of the Portland Traffic Safety Commission's invention should save any community considerable labor in working out a plan for staggered hours.

Detailed statistical studies required as the first step in staggering working hours of the community can be made interesting through the development and use of an adjustable block graph. This not only greatly simplified the work of the planners but also gave the industrial, business, labor, and school groups a graphic picture of the need for their cooperation and how it would be most helpful.

The numbers along the vertical side of the graph represent the number of people by hundreds or thousands traveling by mass transportation facilities to their jobs, and those along the horizontal side represent 24 half-hour time intervals.

Blocks were made in varying vertical lengths to correspond to the number of employees in retail businesses, number of pupils in schools, number of workers in war industries, and so on, that are using public transportation. A different color was also used for each group. The blocks were channeled on one side to fit onto vertical tracks which cut the graph into time periods. They can be set up on the graph to show actual movements of people in each time period, and then shifted into a more desirable staggered hour pattern.

SPEEDING CONVICTIONS

Rhode Island State OPA announced in December that in all cases where speeders use the motor vehicles of other persons or firms, the owners will face OPA hearings for determination of whether their gasoline ration books shall be forfeited.

It had been decided previously that owner-operators of vehicles driven in excess of the wartime limit of 35 miles an hour would forfeit their gas ration credentials.

Decision also has been reached by OPA that speeders of vehicles which they do not own will be sufficient cause for forfeiture of gasoline rations for vehicles which they do own. For example, a truck operator, who speeds a truck owned by another, will lose the ration book for his own automobile and the question of the truck owner's responsibility will be determined by OPA.